

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claims 1 – 17 (canceled)

Claim 18 (previously presented): A method which may be used for producing a silicon nitride film by vapor-phase growth, wherein said method comprises:

- a) feeding a first hydrazine gas and at least one precursor gas into a reaction chamber, wherein:
 - 1) said precursor gas comprises at least one member selected from the group consisting of:
 - i) trisilylamine gas; and
 - ii) silylhydrazine gas; and
 - 2) at least one substrate is located in said reaction chamber; and
- b) forming a silicon nitride film on said substrate by reacting said first hydrazine gas and said precursor gas.

Claim 19 (previously presented): The method of claim 18, wherein:

- a) said silylhydrazine is defined by formula (I)
$$\text{H}_3\text{Si}(\text{R}^a)\text{N}-\text{N}(\text{R}^b)\text{R}^c \quad (\text{I}) ; \text{ and}$$
- b) R^a , R^b , and R^c each comprise at least one member selected from the group consisting of:
 - 1) silyl;
 - 2) hydrogen;
 - 3) methyl;
 - 4) ethyl; and
 - 5) phenyl.

Claim 20 (previously presented): The method of claim 18, further comprising:

- a) creating said precursor gas in a synthesis chamber by reacting a silylamine gas with a second hydrazine gas to form a silylhydrazine gas; and
- b) feeding said precursor gas into said reaction chamber from said synthesis chamber.

Claim 21 (previously presented): The method of claim 18, wherein:

- a) said first hydrazine gas is defined by formula (II)
$$H(R^1)N-N(R^2)R^3 \quad (II) ; \text{ and}$$
- b) R^1 , R^2 , and R^3 each comprise at least one member selected from the group consisting of:
 - 1) hydrogen;
 - 2) methyl;
 - 3) ethyl; and
 - 4) phenyl.

Claim 22 (previously presented): The method of claim 20, wherein:

- a) said silylamine is defined by formula (III)
$$(H_3Si)_mN(H)_{3-m} \quad (III) ; \text{ and}$$
- b) m is 1, 2, or 3.

Claim 23 (previously presented): The method of claim 20, wherein:

- a) said second hydrazine is defined by formula (IV)
$$H(R^x)N-N(R^y)R^z \quad (IV) ; \text{ and}$$
- b) R^x , R^y , and R^z each comprise at least one member selected from the group consisting of:
 - 1) hydrogen;
 - 2) methyl;
 - 3) ethyl; and

4) phenyl.

Claim 24 (previously presented): The method of claim 18, wherein the temperature of the reaction between said precursor gas and said first hydrazine gas is between about 300°C and about 700°C.

Claim 25 (previously presented): The method of claim 18, wherein the pressure in said reaction chamber is between about 0.1 torr and about 1000 torr.

Claim 26 (previously presented): The method of claim 18, further comprising feeding an inert dilution gas into said reaction chamber.

Claim 27 (previously presented): A method which may be used for producing silicon nitride films by vapor-phase growth, said method comprising:

- a) feeding a silylhydrazine gas into a reaction chamber, wherein said chamber contains at least one substrate; and
- b) forming a silicon nitride film on said substrate by a decomposition of said silylhydrazine gas.

Claim 28 (previously presented): The method of claim 27, wherein:

- a) said silylhydrazine is defined by formula (I)
$$\text{H}_3\text{Si}(\text{R}^a)\text{N}-\text{N}(\text{R}^b)\text{R}^c \quad (\text{I}) ;$$
and
- b) R^a , R^b , and R^c each comprise at least one member selected from the group consisting of:
 - 1) silyl;
 - 2) hydrogen;
 - 3) methyl;
 - 4) ethyl; and
 - 5) phenyl.

Claim 29 (previously presented): The method of claim 27, further comprising

- a) creating a silylhydrazine-containing reaction mixture in a synthesis chamber by reacting a silylamine gas with a hydrazine gas; and
- b) feeding said silylhydrazine-containing reaction mixture into said reaction chamber.

Claim 30 (previously presented): The method of claim 29, wherein:

- a) said hydrazine is defined by formula (IV)
$$\text{H}(\text{R}^x)\text{N}-\text{N}(\text{R}^y)\text{R}^z \quad (\text{IV}) ; \text{ and}$$
- b) R^x , R^y , and R^z each comprise at least one member selected from the group consisting of:
 - 1) hydrogen;
 - 2) methyl;
 - 3) ethyl; and
 - 4) phenyl.

Claim 31 (previously presented): The method of claim 29, wherein:

- a) said silylamine is defined by formula (III)
$$(\text{H}_3\text{Si})_m\text{N}(\text{H})_{3-m} \quad (\text{III}) ; \text{ and}$$
- b) m is 1, 2, or 3.

Claim 32 (previously presented): The method of claim 27, wherein the decomposition of said silylhydrazine gas is carried out at a temperature between about 300° C and about 700°C.

Claim 33 (previously presented): The method of claim 27, wherein the pressure in said reaction chamber is between about 0.1 torr and about 1000 torr.

Claim 34 (previously presented): The method of claim 27, further comprising feeding an inert dilution gas into said reaction chamber.

Claim 35 (previously presented): A method which may be used for producing a silicon nitride film by vapor-phase growth, wherein said method comprises:

- a) feeding a first hydrazine gas and at least one precursor gas into a reaction chamber, wherein:
 - 1) said precursor gas comprises at least one member selected from the group consisting of:
 - i) trisilylamine gas; and
 - ii) silylhydrazine gas;
 - 2) at least one substrate is located in said reaction chamber; and
 - 3) the pressure in said reaction chamber is between about 0.1 torr and about 1000 torr; and
- b) feeding an inert dilution gas into said reaction chamber; and
- c) forming a silicon nitride film on said substrate by reacting said first hydrazine gas and said precursor gas, wherein the temperature of the reaction is between about 300°C and about 700°C.